WATER LOCATING.

TWO REPORTS OF THE COMMITTEE OF THE ROYAL SOCIETY OF W.A., APPOINTED TO CARRY OUT TESTS OF WATER LOCATING BY THE REV. W. KENNEDY.

FIRST REPORT—

Mr. Kennedy claimed to be able to detect moving water and to distinguish between fresh water and water containing too much common salt to be utilised by stock.

First Series of Tests.

In each of the following tests one gallon of water was used in an open glass container. The water was stirred with a rod and Mr. Kennedy carried out his tests immediately over the jar. The filter referred to as used by him consisted of a pair of small bags of cloth filled with common salt and placed between his thumbs and the divining rod.

Test No.	Contents.	Reaction of the Rod.		Conclusion drawn by Mr. Kennedy.
		Without Filter.	With Filter.	
A. ...	5% $MgSO_4$ ...	Positive ...	Positive, weak	No common salt, or slightly salt.
B. ...	5% NaCl ...	Positive ...	None	Salt.
C. ...	0·5% NaCl ... (Suitable for Stock.)	Positive ...	Positive ...	Fresh.
D. ...	5% NH_4Cl ...	Positive ...	Positive, very weak	Brackish or stock water.
E. ...	Fresh Water ... (Perth Tap Water)	Positive ...	Positive ...	Fresh.
F. ...	5% Na_2CO_3	Positive ...	None	Salt.

B, C., and E., were direct tests on Mr. Kennedy's claims, and his conclusions, as given above, were correct. A., D., and F. were introduced to ascertain if related salts had any effect on the rod.

Second Series of Tests.

Five one-inch hose pipes were laid in parallel lines on the surface of the Museum Quadrangle, both intake and outlet ends being concealed. Arrangements were made so that, unknown to the person under test, water could be passed through any one hose or any two hoses at a time. The ground had previously been examined by an amateur douser who reported the ground as free from effect of underground water.

Several heavy showers of rain fell between this amateur's test and Mr. Kennedy's tests.

Mr. Kennedy began the test with a blank trial, all the hoses being empty. On the first traverse he obtained no reaction over hoses 1, 2, and 3, but positive reaction over hoses 4 and 5, beneath which he declared there was underground running water which would vitiate any tests with hoses 4 and 5. On a second traverse immediately following the first, Mr. Kennedy obtained a positive reaction over all five hoses, and declared the whole area affected by underground water. This series of tests had, therefore, to be abandoned.

The tests, which were, at best, merely preliminary, had therefore in the end to be greatly curtailed. It is thus impossible to draw general conclusions from the experiments, but the Committee are of the opinion that the results justify fuller inquiry and they recommend that further investigations be made.

EDWARD S. SIMPSON.
W. J. DAKIN,
A. D. ROSS.

Perth, 18th August, 1919.

SECOND REPORT—

The following is a report of some further tests carried out by the Rev. W. Kennedy, at the University, Perth, on the afternoon of 16th April, 1920, in the presence of Professor Ross and Dr. Webster (members of the Committee).

THIRD SERIES OF TESTS—

To decide definitely the meaning of the terms "brackish," "salt," etc., as used by Mr. Kennedy, he was asked to test the effect on his rod (with and without filters) of one gallon of pure fresh water, rapidly stirred in a glass container, to which a strong salt solution (125 grams to the litre) was gradually added. The results are set out in Table I.

TABLE I.

Actual Salt Content.	Mr. Kennedy's Report.
Up to 0·10 per cent. ...	Water apparently quite fresh.
At about 0·12 per cent. ...	Effect of salt barely detectable.
At 0·2 per cent.	Effect still very slight.
At 0·28 per cent.	Water beginning to be brackish.
At 0·37 per cent.	Water slightly brackish.
0·42 per cent. to 0·58 per cent.	Water brackish.
At 0·7 per cent.	Brackish to salt—doubtful water.
Over 0·84 per cent.	Thoroughly salt.

The following divisions or classes were evidently fairly well marked, viz. :

TABLE II.

Class No.	Distinguishing Name.	Salt Content.	
		Percentage.	Grains per Gallon.
i.	Fresh water	0·0	0
ii.	Good, but not quite fresh	0·15	105
iii.	Fresh to brackish	0·3	210
iv.	Brackish	0·5	350
v.	Very brackish or doubtful water	0·7	490
vi.	Thoroughly salt	Over 0·8	560

Fourth Series of Tests.

Five jars, 1, 2, 3, 4, 5, were used, each containing one gallon of pure fresh water. To 2, 3, 4, 5, sodium chloride had been added to give a salt content of 0·5, 1·0, 3·0, and 5·0 per cent. respectively. All the solutions had been carefully filtered. The jars were brought into the room for test, one at a time, in the following order, Nos. 4, 3, 1, 2, 5, 5, 1, 2, 3, 4, 2, 1, 5, 4, 3, care being taken that Mr. Kennedy should be unaware of the return of any jar for retesting.

The inferences drawn by Mr. Kennedy are shown in the following table :—

TABLE III.

Jar.	Salt Content percentage.	No. of Test.	Rev. Mr. Kennedy's Inferences.
1	0·0	3	Brackish—good Stock Water.
		7	Good drinking Water, but not quite fresh.
		12	Fresh Water.
2	0·5	4	Brackish—good Stock Water.
		8	Too Salt for use.
		11	Very Brackish.
3	1·0	2	Doubtful Water—almost Salt.
		9	Between Brackish and Salt.
		15	Salt.
4	3·0	1	Salt—unfit for use.
		10	Practically fresh Water.
		14	Very Brackish
5	5·0	5	Fresh Water,
		6	Salt.
		13	Salt.

In Table IV. these results are summarised by referring to the actual and inferred salt contents according to the classes (1) to (vi.) into which Mr. Kennedy professed to be able to differentiate waters (*see* Table II.). In the last column of the table the term "percentage inaccuracy" has been used as a heading. Fifty per cent. inaccuracy would be the probable inaccuracy on a large number of tests carried out on a person giving his inferences by random guesswork. The results in Table IV., while not nearly so accurate as the few obtained at the Society's meeting last August, nevertheless show a steady margin of successes above those to be expected if the inferences had been mere guesswork.

TABLE IV.

Jar.	Classification.		Classification Errors.		Probable Total on Pure Chance.	Percentage Inaccuracy.
	Actual.	Mr. Kennedy's.	Individual.	Total.		
1	i.	iv. ii. i.	3 1 0	4	7·5	21
2	iv.	iv. vi. v.	0 2 1	3	4·5	33
3	vi.	v. v. vi.	1 1 0	2	7·5	13
4	vi.	vi. ii. v.	0 4 1	5	7·5	33
5	vi.	i. vi. vi.	5 0 0	5	7·5	33
			Average percentage inaccuracy—about			25

Fifth Series of Tests.

On a portion of ground, previously proved by Mr. Kennedy to be free from any vitiating effects of underground water, etc., two three-quarter inch hose pipes were laid several yards apart. Arrangements were made whereby fresh water could be run down hill through the pipes in a rapid current. Mr. Kennedy was asked to make nine successive tests, stating in each case whether or not each pipe was carrying water.

The results obtained are set forth in Table V. :—

TABLE V.

Test.	Water passing in.	Rev. Mr. Kennedy's Inference. Water passing in—
1	Pipe I.	Pipe II.
2	Pipe II.	Pipe I.
3	Pipe I.	Both pipes, but not much water.
4	Neither pipe ...	Neither pipe.
5	Pipe II.	Pipe I.
6	Pipe I.	Pipe I.
7	Neither pipe ...	Pipe II.
8	Pipe II.	Both Pipes, but little in Pipe II.
9	Pipe II.	Pipe I.

In all cases when water was passing the current was rapid, as much as the hose could carry. The results are therefore decisively against the divining rod being of use as an indicator of the flow of water in such pipes.

The Committee feel that the great excess of failures over successes shown in Table V. is not to be described to any "reversed" action of the rod, but is merely an example of the discrepancy from average probability estimates to be expected when dealing with a limited number of tests. This fact must be carefully borne in mind in connection with Table IV., which showed a three to one ratio of successes to failures.

In conclusion the Committee have to report that Mr. Kennedy in a recent letter states that he can get no positive effects with water in pipes. As the results of the other tests described in this report would not justify the expense of field tests necessitating the sinking of wells, the Committee desires to be relieved from further investigations.

A. D. ROSS,
ALFRED WEBSTER,
WM. E. SHELTON.

Perth, 30th April, 1920.